Rock Creek Water Quality Monitoring Project

Water Quality Monitoring Plan

for

Rock Creek
Twin Falls County, Idaho

Developed for:

Snake River Soil and Water Conservation District
Twin Falls Soil and Water Conservation District
Mid Snake Watershed Advisory Group
Idaho State Department of Agriculture

Prepared by:

Idaho Association of Soil Conservation Districts
Twin Falls Field Office
April 29, 1999

Signature Approval Page

_____Date_____
Snake River Soil and Water Conservation District Representative

_____Date_____
Twin Falls Soil and Water Conservation District Representative

_____Date_____
Mid Snake Watershed Advisory Group (WAG)

_____Date_____
Idaho State Department of Agriculture Representative

_____Date_____
Idaho Soil Conservation Commission Representative

_____Date_____
Division of Environmental Quality Representative

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Introduction

Rock Creek is located in the Upper Snake Rock Hydrologic Unit of southern Idaho in Twin Falls County. It is included on the states 303(d) list of streams not meeting their beneficial uses and will be included in a Total Maximum Daily Load (TMDL) analysis to be completed by the end of 1999. The stream has been identified as a stream segment impacted by nonpoint source pollution with the following water quality parameters listed as limiting: bacteria, dissolved oxygen, ammonia, nutrients, oil and grease and sediment. Fecal coliform bacteria levels in Rock Creek have been of particular concern recently to the urban population of Twin Falls where primary and secondary recreation in the creek are common. The purpose of this monitoring project is to monitor water quality to assist in identifying areas for implementation of best management practices. The added information on water quality will help the Snake River and Twin Falls Soil and Water Conservation Districts (SCDs) plan for future watershed practices.

Background

Rock Creek is a tributary of the Snake River, draining approximately 198,000 acres of Twin Falls County in south central Idaho. From its source in the South Hills south of the town of Kimberly, the creek runs to the northwest for 42 miles where it empties into the Snake River about 5 miles northwest of the city of Twin Falls. The upper third of the stream is in a mountainous setting with steep slopes and no agricultural impact other than grazing. This section generally has good water quality. The lower portion of the watershed is a gently sloping plain with highly erosive soils and is underlain by fractured basalt bedrock. Irrigated agriculture and pastureland are major land uses in the lower watershed and have changed the natural flow regime of Rock Creek from a spring snowmelt runoff pattern to one dominated by agricultural irrigation return flows.

Rock Creek water quality has been severely impacted in the past by agricultural and urban sources. Organized efforts to improve water quality have been made previously. From 1981-1991, a Rural Clean Water Program effort focused on the Rock Creek watershed. Water quality monitoring and implementation of Best Management Practices on agricultural land were the focus points of the project and significant improvements were made in water quality. Water quality concerns have not been done away with completely, however. The 1996 303d list includes Rock Creek as a stream not meeting its beneficial uses and a TMDL analysis will be completed by the end of 1999. The TMDL will set allowable allocations of pollutants and water quality standards, which local groups, organizations and landowners will then be responsible for meeting.

Monitoring Request

After discussion with the Snake River SCD and the Natural Resource Conservation Service (NRCS), the Idaho Association of Soil Conservation Districts (IASCD) has offered assistance in water quality monitoring in the Rock Creek watershed. The groups involved feel that monitoring will assist in implementing useful BMPs to meet the TMDL allocations that will be determined later this year.

Objectives

IASCD will work with the agencies previously listed to meet the following objectives.

1) Assess existing water quality conditions and impacts from agricultural activities.
2) Establish photo points to document stream corridor condition over time.
3) Identify areas of concern for implementation of BMPs by local agencies and groups.
4) Identify and characterize major agricultural nonpoint pollution sources that degrade water quality.
5) Use the data for public awareness.

Monitoring Program and Sites

This monitoring program will be managed by the Idaho Association of Soil Conservation Districts (IASCD) with assistance from the Soil Conservation Commission (SCC), Natural Resources Conservation Service (NRCS), Idaho Division of Environmental Quality (DEQ) and the Lake Walcott Watershed Advisory Group (WAG). IASCD and ISDA will conduct the fieldwork and supply the technical support, funding and equipment. Additional assistance for monitoring may be provided by SCC or NRCS personnel.

Monitoring will be done at 5 sites throughout the watershed. See Table 1 on the following page for a list of sites and descriptions. Samples and field measurements will be taken for the parameters in Tables 2 and 3 respectively. In addition, photo points will be established and taken at each site. This is described in the next section. Monitoring will be done twice a month from the beginning of the project (May 1999) throughout the irrigation season and once a month during the non-irrigation season until one year of monitoring is complete. If more data is needed at that point, discussion with all concerned agencies and individuals will determine any additional monitoring.

Table 1 Site Descriptions

Site	Description
RC1	Rock Creek @ 3400 N
RC2	Rock Creek @ 3500 E (north of Kimberly)
RC3	Rock Creek @ 2950 N
COT	Cottonwood Creek just above confluence with McMullen Creek
MCM	McMullen Creek just above confluence with Cottonwood Creek.

Sampling Methods

Photo Points

Photographs will be taken at each site for each sampling event to document the condition of the stream channel corridor over time. Sites for the photo points will be selected in the

field and will be marked and documented so each photo will be taken from the same location. These photos will be used as documentation of the visual condition of the stream corridor at each site and of any changes over time. Efforts will be made with other agencies to combine the photos with riparian and stream channel assessment and monitoring and to continue using the established points as photo points.

Water Quality

Samples for water quality analysis will be collected by grab sampling directly from the source. The sampling sites will be located away from any obstructions to avoid backwater effects within the channel. For incised shallow creeks or drains six one liter grab samples will be collected from a well-mixed section, near mid-stream at approximately mid-depth. For larger creeks, multiple grab samples will be collected at equal intervals across the cross section to provide a representative sample. For shallow sites (< 1ft) grab samples will be collected by hand using a clean one-liter stainless steel container. At sites where the water depth is greater than 1 foot, a DH-81 integrated sampler will be used. With all of the methods, individual samples will be collected at equal intervals across the entire width of the drain or creek. Each discrete sample will in turn be composited as mentioned in the following paragraph. The specific location, number of grabs and sample collection technique will be determined after observation of the conditions at each site.

Except for bacteriological samples, each grab sample will be composited into a 2.5 gallon polyethylene churn sample splitter. The composite sample will then be thoroughly homogenized and poured off into properly prepared sample containers. For samples requiring filtration (ortho-phosphorous), a portion of the sample water will be transferred into the filtration unit and pressure filtered through a .45 µm. GN-6 Gelman Metricel Filter. The resultant filtrate will be transferred directly into a properly prepared sample bottle. The filtration unit will be thoroughly rinsed with deionized water and equipped with a new .45 µm. filter at each sampling location. Water for nutrients that require preservation, will be transferred into preserved (H2SO4pH <2) 500 ml sample containers. The polyethylene churn splitter will be thoroughly rinsed with source water at each location prior to sample collection. Bacteriological samples will be collected directly from the midstream discharge into properly prepared sterile sample bottles. Parameters, analytical methods, preservation and holding times are included below in Table 2.

All sample containers will be equipped with sample labels that will be filled out using water proof markers and will indicate station location, sample identification, date and time of collection. Clear packing tape will be wrapped around each sample bottle and label to insure that moisture from the coolers does not cause the loss of sample labels. All resultant samples will be placed in a cooler, on ice until delivery to the laboratory and will have Chain-of-Custody forms sealed in zip-lock baggies with each sample shipment. All samples will be taken to Magic Valley Lab, in Twin Falls, for analyses.

Table 2. Water Quality Parameters

Parameters	Sample Size	Preservation	Holding Time	Method
Non Filterable Residue (TSS)	200 ml	Cool 4°C	7 days	EPA 160.2
Total Volatile Residue (TVS)	200 ml	Cool 4°C	7 days	EPA 160.4
Nitrogen-nitrate/nitrate	50 ml	Cool 4°C, H_2SO_4 pH < 2	28 days	EPA 353.2
Total Phosphorous	100 ml	Cool 4°C, H_2SO_4 pH < 2	28 days	EPA 365.4
Ortho Phosphorous	100 ml	Filtered, Cool 4°C	24 hours	EPA 365.2
Fecal Coliform, Total Coliform, E. Coli	250 ml	Cool 4°C	30 hours	Standard Methods

Field Measurements

At each location, field measurements for dissolved oxygen, specific conductance, pH, temperature and total dissolved solids will be taken. These measurements will be taken, when possible, from a well-mixed section, near mid-stream at approximately mid-depth. Calibration of all field equipment will be in accordance with the manufacture specifications. Refer to Table 2 below for a list of field measurements, equipment and calibration techniques.

Table 2. Field Measurements

Parameters	Instrument	Calibration
Dissolved Oxygen	YSI Model 55	Ambient air calibration
Temperature	YSI Model 55	Centigrade thermometer
Conductance and TDS	Orion Model 115	Conductance standards
pH	Orion Model 210A	Standard buffer (7,10) bracketing for linearity

All field measurements will be recorded in a bound logbook along with any relevant observations about the site, including weather conditions, flow rates, personnel on site, or any problems observed that may affect the quality of data.

Flow Measurements

Flow measurements will be collected by wading and using a Marsh McBirney Flow Mate Model 2000 flow meter. The six-tenth-depth method (0.6 of the total depth below water surface) will be used when the depth of water is less than or equal to three feet. For depths greater than 3 feet the two-point method (0.2 and 0.8 of the total depth below the water surface) will be used. At each station, a transect line will be set up perpendicular to flow across the width of the drain or creek. The mid-section method for computing cross-sectional area along with the velocity-area method will be used for discharge determination. The discharge is computed by summation of the products of the partial areas (partial sections) of the flow cross-sections and the average velocities for each of those sections. This method will be used to calculate cubic feet per second at each of the monitoring stations.

Quality Assurance and Quality Control (QA/QC)

Magic Valley Labs uses EPA approved and validated methods. Laboratory QA/QC results generated from this project can be provided upon request. QA/QC procedures from the field sampling portion of this project will consist of duplicates (at least 10% of the sample load) along with blank samples (one set per sampling event). The field blanks consist of laboratory grade deionized water, transported to the field and poured off into prepared sample container. The ortho-phosphorous blank will be collected by filtering deionized water through the filtration unit and transferring the resultant filtrate into an appropriate sample container. The blank sample is used to determine the integrity of the field team's handling of samples, the condition of the sample containers supplied by the laboratory and the accuracy of the laboratory's methods. Duplicates consist of two sets of sample containers filled with the same composite water from the same sampling site. The duplicates are used to determine both field and laboratory precision. The duplicate samples will not be identified as such and will enter the laboratories blindly for analysis. Both the duplicates and blank samples are stored and handled with the normal sample load for shipment to the laboratory.

Data Handling

All of the field data and analytical data generated from each survey will be submitted to Idaho Department of Agriculture for review. Each batch of data from a survey will be reviewed to insure that all necessary observations, measurements and analytical results have been properly recorded. The analytical results will be reviewed for completeness and quality control results. Any suspected errors will be investigated and resolved if possible. The data will then be stored electronically for further review and preparation of final reports. A final report will be generated by IASCD and ISDA summarizing the results of this monitoring program.